Assignment 5 : Context Free Grammars

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Problem #1

$$
\begin{aligned}
\langle expr \rangle &= \langle expr \rangle * \langle expr \rangle \\
&= \langle expr \rangle * \langle int \rangle \\
&= \langle expr \rangle * -\langle nat \rangle \\
&= \langle expr \rangle * -\langle digit \rangle \langle nat \rangle \\
&= \langle expr \rangle * -0\langle nat \rangle \\
&= \langle expr \rangle * -0\langle digit \rangle \\
&= \langle expr \rangle * -07 \\
&= \langle expr \rangle + \langle expr \rangle * -07 \\
&= \langle expr \rangle + \langle nat \rangle * -07 \\
&= \langle expr \rangle + \langle digit \rangle * -07 \\
&= \langle expr \rangle + 2 * -07 \\
&= \langle int \rangle + 2 * -07 \\
&= \langle nat \rangle + 2 * -07 \\
&= \langle digit \rangle \langle nat \rangle + 2 * -07 \\
&= \langle digit \rangle \langle digit \rangle + 2 * -07 \\
&= \langle digit \rangle 2 + 2 * -07 \\
&= 12 + 2 * -07
\end{aligned}
$$

Problem #2

$< stmt >$

for $< id >=< expr >$ to $< expr >$ do $< stmt >$

for $< letter >=< expr >$ to $< expr >$ do $< stmt >$

for $x =< expr >$ to $< expr >$ do $< stmt >$

for $x =< int >$ to $< expr >$ do $< stmt >$

for $x = - < nat >$ to $< expr >$ do $< stmt >$

for $x = - < digit >< nat >$ to $< expr >$ do $< stmt >$

for $x = -1 < nat >$ to $< expr >$ do $< stmt >$

for $x = -1 < digit >$ to $< expr >$ do $< stmt >$

for $x = -12$ to $< expr >$ do $< stmt >$

for $x = -12$ to $< int >$ do $< stmt >$

for $x = -12$ to $< nat >$ do $< stmt >$

for $x = -12$ to $< digit >< nat >$ do $< stmt >$

for $x = -12$ to $1 < nat >$ do $< stmt >$

for $x = -12$ to $1 < digit >$ do $< stmt >$

for $x = -12$ to 10 do $< stmt >$

for $x = -12$ to 10 do $\{< stmts >\}$

for $x = -12$ to 10 do $\{< stmt >; < stmts >\}$

for $x = -12$ to 10 do $\{< id >=< expr >; < stmts >\}$

for $x = -12$ to 10 do $\{< letter >=< expr >; < stmts >\}$

for $x = -12$ to 10 do $\{y =< expr >; < stmts >\}$

for $x = -12$ to 10 do $\{y =< int >; < stmts >\}$

for $x = -12$ to 10 do $\{y =< nat >; < stmts >\}$

for $x = -12$ to 10 do $\{y =< digit >; < stmts >\}$

for $x = -12$ to 10 do $\{y = 0; < stmts >\}$

for $x = -12$ to 10 do $\{y = 0; \text{pass}\}$